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ABSTRACT

This guide to science instruction for third grade students of English as a second language encourages teachers to develop curriculum materials related to specific subject areas in teaching communication skills to Spanish-speaking children. A series of concepts to be imparted in the classroom is presented. For each concept, learning objectives, central activities, teaching materials, classroom procedures, and evaluation criteria are described. The concepts revolve around sounds and the phenomenon of sound. (JB)

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TEACHING ESL THROUGH SCIENCE

THIRD GRADE UNIT ON SOUND

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BILINGUAL TRAINING AND RESOURCE CENTER

New Mexico State University

December 19, 1979

Introduction

Through science activities children can increase both communication skills and cognitive growth. While the transition from Spanish to English is being made a child is given an opportunity to utilize the target language as he communicates the results of his observations, classifications and predictions.

Science topics give the conceptual base and practice for vocabulary and syntactic development, terms-relating to similarities, description, comparison, and part-whole relationships are common in both language development and basic science instruction.

Science language correlation is a technique not related to a particular age group or language ability level (Korn. 1).

Science is often shortchanged, partly because teachers feel that language development must come first. Yet numerous studies indicate that language ability can be significantly increased through active participation in activity science programs. (Korn. 2).

Some of the most fascinating units are those developed around students previous experiences. Many ESL students have had rich cultural and life style experiences from which teachers should draw references and illustrations in teaching the various science concepts. Teachers need to relate these experiences in their instruction and recognize the value of these family related knowledge in order to facilitate learning of the target language.

Secondly, children will have a greater chance for target language practice if groups are heterogeneous. That is, with differing language abilities including one or two students who are not English dominant, one or two who are, and one or two who are closer to being bilingual (Korn, 3). Through peer teaching and modeling a good deal of interaction can occur.

The purpose of this paper is to encourage teachers to develop curriculum materials related to specific subject areas in teaching communication skills to Spanish-speaking children. It is our firm belief that cognitive growth can continue while a child is learning a second language. Therefore, by utilizing learning centers, emphasis can be placed upon an activity or an experience which illustrates the concept to be taught, followed by an oral language pattern exercise. Teachers can assist children in writing ideas or observations on charts as more proficiency is gained in the target language. Later these writings can be included in follow-up lessons on vocabulary, experience charts or booklets for reinforcement and review.

The teacher's dual role is to act as a facilitator for learning and as a model to groups or individuals in encouraging children to practice proper language sentence patterns when appropriate.

Concepts	Objectives	Activity Centers	Materials	Procedures	Evaluation
1. Sounds a) What is sound? ¿Qué es un sonido?	a) The child will be able to discover that different objects or things make different sounds. El niño descubrirá que diferentes objetos producen diferentes sonidos.	a) Play a tape on sounds. Play 5 sounds at once.	a) Tape on sounds. Recorder, head phones	a) Children hear tape of sounds and identify the 5 sounds verbally. ESL Patterns: T: What do you hear? (¿Qué oyes?) P: I hear a noise/sound. (Un sonido o ruido) T: What kind of noise? (¿Qué clase de ruido?) P: Water running. (agua corriendo)	a) Through listening children identify verbally 4 out of 5 sounds.
	b) The child will identify a sound and will match that sound to its picture. El niño identificará un sonido y identificará el objeto que produce el sonido.	b) Play tape again, display 5 pictures, and match sound to a picture.	b.) Pictures (Peabody Kit are appropriate) Scratching an object Splashing water whistling an object a fallen object on floor. water running busy street siren bell crushing paper hitting metal blowing across a bottle.	b) Children match the sound with a picture. ESL: Patterns T: Show me a picture of the sound you hear. P: I hear water running. This picture shows water running.	b) Children will match picture to sound correctly 4 out of 5 times.

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Sounds			pop of bubble (gum) piano. washing machine type writer blender telephone vacuum cleaner television radio hair dryer	this is a picture of splashing water." "I hear water splashing?"	
2. Moving objects make sounds Objetis en movimiento producen sonidos	a) The child will discover that moving objects produce sounds. El niño descubrirá que movimiento causa el sonido en objetos	a) Play a blank tape and show pictures of silent objects.	a) Pictures of objects that make no sound: plant, flower, grass, wood, log, lake, cloud, rock, sun, mountain, moon. tape recorder blank tape head phones	a) Ask: What do you hear when you see this picture. (mountain) (play tape and show all pictures as tape plays) Ask: Why is it silent? (¿Porque' se oye silencio?) b) Constrast 2-3 noise pictures with silent pictures	a) Do children discover that objects need to move to produce sounds? Can children name other things that don't produce sounds?

ncepts	Objectives	Activity Centers	Materials	Procedures	Evaluation
Sounds 3. Sounds are vibrations sonidos son vibraciones.	a. The child will discover how sounds are made. El niño descubrirá como es el sonido producido.	a. Activity center I Experiment I	a. Tuning fork container/with water.	a. Children will hit the tuning fork, and then touch the water in the container. Children will also put the fork in container of water without hitting it first. Describe results. (Write children's comments on board, or chart)	a. Children will discover that as objects move they produce sounds. Children will show initiative in trying the experiments and testing their ideas. Conclusions 1. Moving objects make sounds. 2. Slow movement makes low sound. 3. Fast movement makes loud sound. 4. No movement, no sound.
	b.) the child will discover how sounds are made. El niño descubrirá como es el sonido producido	b.) Experiment II	b) Mallinson: Science, text p. 188 Hammer Board (30 cm'l) 4 nails thick rubber bands	b. Prepare board with nail directions in text p. 188. Have children explore: Ask: T: What sound did you hear? (stretch rubber band)	b) Children will discover verbally that as movement is increased, sound is louder, and as movement decreases, sound is softer.

Co. pts	Objectives	Activity Centers	Materials	Procedure	Evaluation
	c. The child will discover how sound travels. El niño descubrirá como viaja un sonido	C1 Experiment I:	C1 Mallinson, Science test p. 191 - 194 Water container tuning fork.	P: I heard a ___ sound. T: What made the sound? P: ___ T: When did the rubber move fast? Slow? Did it vibrate fast? slow? C1 Be sure you have a large container with water, bowl, deep plate etc. Without hitting the fork, touch the center of the water, and observe water waves. Make an analogy: Ask: When I throw a rock into a lake, or water puddle. What do you see? Ans: Water waves or ripples Ask: If I put a stick in the center, and throw a rock to it. Will the stick move to the	c. 1. Children show initiative in responding to questions and experiment. 2. Children will discover verbally that waves are produced when an object moves. 3. Children will describe verbally how an object moves in water.

epts	Objectives	Activity Centers	Materials	Procedures	Evaluation
				edge of the water? Ans. Yes. The water waves pushes it out. T: Explain. The stick traveled from the center to the outside. Sound acts the same way. The sound waves push away from center to ear through air. Illustrate: water waves. Note: Translate only when necessary to clarify a concept. However, have child respond in English as you model for him the response.	4. Children will apply analogy of water waves to air as a medium for sound to travel. Possible conclusions: a) Sound causes air to move/push away like a ripple. b) We cannot see the ripples in air because air is invisible, but without air, there are no waves. (Moon) Without water there are no ripples. c) The ripples are the sound waves.

Concepts	Objectives	Activities	Materials	Procedures	Evaluation
		C2 Experiment 2	C2 wrist watch meterstick iron bar Mallinson, SCIENCE, p. 194.	C2 Ask: "Do you think sound will travel through wood? Iron? TRY EXPERIMENT. Ask: "Do you hear the clock?" Response: "I can hear the watch." ACCEPT ANY RESPONSE THE CHILD MAKES about what was observed.	C2. Do children discover that sounds travel through air, wood a iron? C.3. Do children discover that sound travels best through air and iron?
4a. Sound travels fast. El sonido viaja rápido.	The child will discover through class and personal experiences that sound travels fast. El niño desubriria durante experiencias en el aula, y experiencias personales que el sonido viaja rapido.	Follow-up experiment	Mallinson, Science p. 200-201	4a Ask: How long does it take sound to reach your ear? When you talk to a friend how long does it take for their voice to reach your ears? b. Explain: Sounds travel 1,100 feet in one second. Make an analogy. If I put 4 football fields together and someone	4a. Do children respond to questions? Do children comment on personal experiences in relation to the speed of sound? b. Can children identify with the analogy made? Do children discover through inquiry that sound travels fast, but light is faster?

Concepts	Objectives	Activities	Materials	Procedures	Evaluation
				called me. I can hear the sound in 1 second. Light travels faster than sound. (Make lightning and thunder analogy) Sound has speed. Sound travels fast. Light travels faster than sound. Which is faster, light or sound? c. Say: Sound travels faster through metals than through air. Clarify what metals are. Say: This is a metal box. What else is made of metal? Chairs, file cabinet, file box, etc.	c. Do children name at least 5 objects in classroom made out of metal?

Concepts	Objectives	Activities	Materials	Procedures	Evaluation
	5. Children will discover that sounds travel fast through metals. Los niños descubriran que sonidos viajan rápido por medio de metales.	5. Semi-circle discussion	5. Picture of radio antenna	5. Ask: Is it good for us that a sound can travel through a metal? What sounds can you hear that comes through metal wire? Possible responses; radio, tv, telephone (Reinforce any response) Say: Wires are not needed to carry radio sounds. (Show picture of radio antenna and draw in sound waves.) Explain: Sound waves comes to the radio, radio changes them to music.	5. Do children response with at least one example of an object that carries sounds? Do children respond to questions Are children active in responding.

Concepts	Objectives	Activities	Materials	Procedures	Evaluation
	6a. Children will discover that sounds can be controlled. El niño descubrira que el sonido puede ser controlado.	6a. Semi-circle discussion	6a. Peabody Kit, Pictures: telephone, radio, tv, record player, musical instruments.	6a. Ask: Does this means we can control sound? Can we make sound do what we want? Discuss any response. Example (the telephone) If children can't think of other examples suggest some as you show picture. Repeat: I can control sound in a radio. (telephone, record player, guitar, etc) I can make sound loud or soft.	6a. Do children discover that we can control sound?
		6b) Experiment: three	6b. Mallinson, Science p. 207. Rubber ball soft pillow or carpet square	Ask: In what other way do we control sounds? How does this help us?	6b. Do children respond to experiment with conclusions or questioning? Do children discover that hard surface give out

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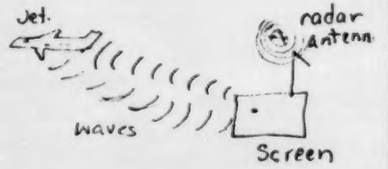
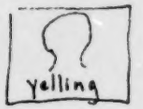
				Do experiment: a) Bounce ball on floor. Listen for sound. b) Bounce ball on carpet, listen for sound. Ask: What happen to the sound? Discuss. Guide children to discover that flat hard surfaces make sound waves bounce harder, therefore making sound louder. Soft surfaces Keep or absorb some of the sound waves, producing low sounds. Possible Conclusions: - Sound is louder when the ball bounces on floor	more sound than soft surfaces? Do children make conclusions about experiment?

Concepts	Objectives	Activities	Materials	Procedures	Evaluation
				- sound is softer when when the ball bounces on the carpet. - carpeting on floors helps to cut down noise - ceiling tiles help absorb sounds (If possible look at a piece of ceiling tile with a magnifying glass.)	
	7. Children will discover through inquiry and class experiments that echoes are reflected sounds. Por medio de preguntas y experimentos que los ecos son Sonidos reflejados.	7. Follow-up of experiment	7. Pictures: Radar antennas. Mallinson, Science p. 202-203	7. Ask: What is an echo? Discuss, listen to children's experiences Ask: How can we use an echo? If children cannot think of ways we use echos give example (Radar, boats) Discuss.	7. Do children respond to question? Do children describe what an echo is? Possible conclusions: from discussion: - Echos are reflected sound waves - In radar, radio waves are seen as a screen. This screen is like a t.v. screen. The pictures on the radar screen shows where objects are. Draw

Concepts	Objectives	Activities	Materials	Procedures	Evaluation
					picture.



Concept	Objective	Activity Centers	Materials	Procedures	Evaluation
1. Sounds Human Sounds Animal Sounds Sonidos Humanos y de Animales	1. The child will be able to identify human sounds: How we produce sounds. El niño identificara sonidos producidos por el hombre, y como es producido.	1. Display pictures of people producing sounds. Follow with discussion.	Mallinson, Mallinson, and Feravolo, Science Understanding Your Environment p. 189-193 SCDC Spanish Curriculum Guide - Unit 8, Grade 3 *Ed 161 652 TG. Ed 161 653 - Supplement and ditto packet. Pictures of people making sounds, singing, yelling, humming, screaming, talking, gurgling, laughing, crying, whispering. [Ed: ERIC DOCUMENT REPRODUCTION NUMBER.)	1. Show pictures to children Ask: What are the people doing in the pictures? "They are making sounds." "He is singing." "She is yelling." Ask: Can you make this sound.  (show picture) Have children make various sounds with their throat, and feel their throat. Explain: Man has a voice box in his throat. Two parts of the voice box makes sounds. They are flaps of muscle called vocal cords. p. 189	The child will identify 4 out of 5 sounds from the pictures shown.

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				They stretch across the top of the voice box air from your lungs passes over them. This causes the muscles to vibrate (If possible show a model to describe process. You can stretch or relax these muscles to control the sounds they make. This helps you talk, sing, and laugh. Discussion - Ask: What else do you use to help you make sounds? Respond: I use my lips (mouth, tongue, nose, teeth.) Experiment saying words without the use of lips, mouth, tongue, nose or teeth.	Children will explain verbally the function of the voice-box in producing sounds.

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Concept	Objectives	Activities	Materials	Procedures	Evaluation
2. The human ear, and its function. El oído humano y su funcionamiento.	2. The child will name the parts of the ear. El niño nombrará las partes del oído.	2. Semi-circle discussion	2. Chart diagram of the ear. (If possible obtain a model of the ear.)	2. Through pictures or model display, point to one major part of the ear and name it. Have children repeat it using same procedure, have children act as teachers and ask other classmates to respond. ESL Patterns What's this/that? This is the ear. This is the outer ear. This is the middle ear. This is the inner ear. (Repeat with each part of the ear.)	2. Children name the major parts of the ear.
	3. The child will describe the process involved in hearing sounds. El niño describira el proceso del oído en oír sonidos. (El sistema auditivo)	3. Experiment with ear model.	3. Ear model and diagram of the ear. Radio.	3. Explain the function of each part of the ear. a.) The outer ear collects the sound wave. b) The middle ear amplifies the sound wave and passes it to the inner ear. (Explain the meaning of amplifies.)	3. Can children describe how we hear sounds? Can children describe what is the function of each part of the ear?

Concept	Objectives	Activities	Materials	Procedures	Evaluation
				c) The inner ear changes the vibrations into nerve messages that go to the brain d) The brain identifies the sound.	
	4. The child will explain how the ear can be hurt by loud noises. El niño esplicara como el oido puede ser dañado por sonidos fuertes.	4. Follow-up with ear model Experiment listening to loud noises, soft noises.	4. Ear model diagram picture of the ear	4. Explain how a loud noise can harm the ear. Conclusions: Loud noises can tear the eardrum. Through discussion, lead children to discover that prolonged noise can cause a person to lose his hearing.	4. Children will verbally explain how the ear can be harmed with loud noises. Children will conclude that prolonged noise can cause loss of hearing.
Animal Sounds	1. The child will be able to identify animal sounds. El niño identificará sonidos de animales	1a. Play tape, identify animals producing the sound.	1a. Tape on animal sounds Record player headsets Peabody picture kit animal pictures.	1a. Play the tape on animal sounds. Identify 5 sounds at a time. (eg. bark, cry, rattle, whistle, meow, chirp, grunt)	1a. Do children identify 4 out of 5 sounds correctly

Concepts	Objectives	Activities	Materials	Procedures	Evaluation
		1b) Play tape again, match sound to picture of animal.		1b) Dislay 5 animal pictures Have children identify and match the free animal making the sound in the tape. (The dog says bow-wow) (The cow says mooo)	1b) Do children match all the animals to their sounds?
	2a) The child will discover that animals communicate different from humans. El niño descubrirá que los animales se comunican diferentes a los humanos.	2a. Discuss, and observe pictures of animals. Group discussion. Contrasting Similiarities and differences in pictures.	Mallinson, Science p. 190 Pictures of animals. (snakes, frogs, grasshopper) Picture of baby animals. Pictures of doing various sounds.	2a. Discuss and observe how a grasshopper makes sound. (grasshopper, frog) Relate the way a grasshopper makes noise with experiment II. Through a comparison of animals and human sounds help the child discover how a man communicates as compared with an animal. Possible ESL Patterns: A bird chirps. A bear can grunt. A bird doesn't grunt. A bear doesn't chirp. A bird can sing. A cat doesn't sing. A baby cries.	2a. Do children apply what was learned on previous experiments with the way some animals produce sounds. The child will make the following conclusion a) Man talks to communicate with each other. b) Animals make different sounds to communicate with each other.

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Concepts	Objectives	Activities	Material	Procedure	Evaluation
	3a) Some animals can make several different noises. Algunos animales pueden producir varios sonidos.	3a) Discussion of similarities and differences in animal sounds.	3a. Pictures, animals, man	3a. Through discussion of similarities and differences guide children to discover that some animals can make several different noises. A dog can whimper. (howl, growl, bark) A bird can chirp (sing, whistle, tweeter, etc) (Write words on cards say sentence, leave out last word, child fills in correct response). Repeat such sentence as a group, & individually A man can whistle. The lady yells. The lady doesn't chirp.	3a. Are children able to match noise to animals. dog (picture) → barks (word) cat → purr (word) baby → laughs

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. Noises (Sounds) pleasant unpleasant harmful Sonidos: senteros, o idables, agradables, judicales	1. The child will be able to identify and classify sounds that contribute to noise pollution. El niño identificara y clasificara los sonidos que contribuyen a la contaminación de ruido.	Activity Center III a. Collage: themes 1. Pleasant sounds 2. Unpleasant sounds b. Booklets: themes 1. Sounds I Like 2. Sounds I Don't Like 3. Sounds That Hurt Me c. Mural: Themes 1. Noises in the country 2. Noises in the city 3. Noises at Home, School, Park, Zoo, etc.	a. Large drawing paper, glue, scissors, crayons, markers, magazines, catalogs b. Teacher prepared 3-page booklet, scissors, glue, crayons, markers, magazines. c. Butcher Paper crayons, glue, scissors, markers, magazines	a. Ask children to choose one theme, then cut off pictures from magazine to fit into collage theme. b. Prepare a three-page booklet. Have children write theme and draw or cut out and paste pictures. c. On a large piece of paper have children (3-4) in a group draw a picture of country and things that make a sound. Assist by labeling objects.	a. Is child able to identify sounds from the collage? Patterns to encourage child's response: The bird makes a (nice/pretty/pleasant sound.) b. What kind of sounds do you like/don't like? Why? "I like the bird's song (song, music, piano playing, radio playing etc.) It's pretty." "The train's whistle hurts my ear." c. Children identify verbally items in country that make sounds. i.e. "The cows says moo!" "The sheep says b-a-a-a!" "The ice cream truck goes ting-a-ling." Vary using pronouns My, Your, His, Her My cow says mooo, Your cat says meow.

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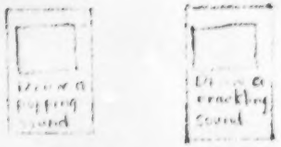
Concepts	Objectives	Activity Centers	Materials	Procedures	Evaluation
		d. Booklet: Identification of Sounds 4-5 pages. Vocabulary: busy, crackling, dripping, rubbing, loud, soft, squeaky, popping, rattling, switchy, rubbing, whirrly, roaring, gurgly, etc.	d. Loose leaf sheets with written instructions, magazines catalogs, crayons, glue, scissors	dFor each page in the booklet, print any of the following instructions for children to draw. Children choose 4-5 to draw. 	d. Children draw appropriate picture as given. "This is a crackling sound." "The bees make a busy buzzy sound." "The bell rings loud." (Encourage any response)

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